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ABSTRACT

Achievement patterns of one hundred first-grade children are investigated with respect to socioeconomic status and kindergarten attendance. Twenty-five pupils were selected from each of the fcllowing groups: (1) middle socioeconomic levels who attended kindergarten: (2) middle levels who did not: (3) lower socioeconomic levels who attended kindergarten: and (4) lower socioeconomic levels who did nct. The results of the study support the concept of kindergarten for all children regardless of socioeconomic background. However, data revealed in the investigation indicated that providing such an experience does not make up for past deficits related to socioeconomic status. Further studies in this area are promoted. (MP)

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THE EFFECTS OF KINDERGARTEN ATTENDANCE ON MATHEMATICS ACHIEVEMENT OF MIDDLE AND LOW SOCIOECONOMIC LEVEL CHILDREN

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The Effects of Kindergarten Attendance on Mathematics Achievement of Middle and Low Socioeconomic Level Children

According to the Consortium for Longitudinal Studies (Lazar and Darlington; 1980) "All lower-income children can apparently benefit from preschool experience." These investigators controlled for IQ, sex, number of siblings, mother's education, father's absence, and ethnic background. These researchers also concluded that "all analyses, yielded the same basic conclusion: preschool makes a positive contribution to later school performance of low-income children."

Early childhood educators have long recognized that children from middle and higher socioeconomic level families have a distinct academic advantage, making the kindergarten experience less influential on achievement. However, Herzog, Newcomb, and Cisin (1972) found that higher socioeconomic level children made larger gains and also retained a larger portion of their gains than did lower socioeconomic level children. Contrary results were found by Caldwell and Richmond (1968) who reported that the most disadvantaged children tended to show the largest IQ gains.

Mussen, Conger and Kagan (1974) report that the environmental factors that appear to exert the greatest impact on intelligence test performance are early rearing and the child's social class. Families in low socioeconomic groups, compared with those from the middle class, typically provide their children with different cognitive and language experiences and put much less stress on the values of intellectual development and achievement.

The findings are mixed regarding the amount of gain made by children from middle to high socioeconomic levels as compared to the amount of gain made by children from a low socioeconomic level. However, while it does

appear that language programs add nothing to the non-disadvantaged child's environment that was not present in his home (Di Lorenzo, 1969) this might not be the case with mathematics.

Analysis according to Woodruff (1980) suggests "The preschool experience of the middle to higher socioeconomic child within the family is likely to be more limited in mathematics than language and reading." Begle (1979) after reviewing fifteen studies, reported that preschool experience leads to better mathematics achievement in the early grades. Haines (1960) studied two communities of children K-6 and 1-6. It was found that the children from the community with kindergarten scored significantly higher in mathematics but not in reading. He suggests that the effects of the kindergarten experience may be stronger in influencing achievement in mathematics than in reading. The State of Tennessee recently compared the Basic Skills Test Scores of eighth grade pupils who did (42,000) and did not (22,000) attend kindergarten. The advantage held by kindergarten attendees was greatest in Mathematics, (Woodruff 1980).

Currently Mississippi is re-examining its position relevant to kindergarten education, thus this study was conducted to investigate the effects of kindergarten experience on the mathematics achievement of first graders from middle and low socioeconomic levels.

Method

The subjects for this study were one hundred first grade children enrolling in the fall of 1980 in a metropolitan area in Mississippi.

In order to produce achievement patterns in terms of kindergarten attendance and socioeconomic status, twenty-five children were chosen from each of these groups:

1. Middle socioeconomic levels who attended kindergarten
2. Middle socioeconomic levels who did not attend kindergarten
3. Lower socioeconomic levels who attended kindergarten
4. Lower socioeconomic levels who did not attend kindergarten

The lower socioeconomic pupils selected for this study were of a low socioeconomic status as defined by the 1979-1980 Public Schools Title I document. Two schools which produced approximately 80% of the lower socioeconomic population are 95% black.

Middle socioeconomic status was defined in terms of family income and its acquisition as reported by parents to the public schools. In order to satisfy the middle socioeconomic criteria it was necessary to review test data of children attending an alternative school with an approximately 50% white and 50% black enrollment. Twenty percent of the lower socioeconomic population were also enrolled in this school.

Approximately 57% of the children in this study were female and 43% were male. Approximately 70% of the children were black and 30% were white.

The mathematics performance of these pupils entering first grade was determined by using Form II of the Metropolitan Readiness Test.

Results

A 2X2 ANOVA was run on mathematics achievement (stanines) with significance indicated for socioeconomic background ($F=16.616$, $p<.01$) and preschool experience ($F=5.508$, $p<.05$). However, the interaction effect was not significant ($F=2.579$, $p>.05$). (See Table I). This lack of significant interaction is further illustrated by figure I.

The Neman-Keuls Test (Marigold and Gallo, 1975) for multiple group comparisons was run to determine if groups differed significantly. This analysis revealed that the middle socioeconomic group with kindergarten

experience was significantly higher in mathematics than the low socioeconomic group with and without kindergarten experience ($p < .01$) and the middle socioeconomic class without kindergarten ($p < .05$). In addition, the middle socioeconomic group without kindergarten experience was significantly higher in mathematics achievement than the low socioeconomic group without kindergarten experience ($p < .05$). The middle socioeconomic group without kindergarten did not differ significantly from the low socioeconomic group with kindergarten ($p > .05$), nor did the low group with kindergarten differ significantly from the low group without kindergarten ($p > .05$).

To determine the strength of association between socioeconomic class, kindergarten experience and achievement in mathematics eta squared was computed. This computation revealed that the two independent variables accounted for 18.3% of the variation in mathematics achievement (socioeconomic class, 13.8%, kindergarten experience, 4.5%).

Discussion

The results of this study support the concept of kindergarten experiences for children regardless of socioeconomic background. However, the study presented evidence to show that providing the kindergarten experience does not make up for past deficits related to socioeconomic status.

This study was initiated to further explore the position that social interactions among young children would place lower socioeconomic level children in, if not an "advantaged" situation, at least an equal one. It was conjectured that the early development of mathematics concepts would result from the greater opportunity low income children have in social situations. This was not the case in this study since the middle socioeconomic group without kindergarten experience was signigicantly higher in mathematics achievement than the low socioeconomic group without kindergarten experience.

The results of this exploratory study must be viewed with caution since the groups were not equated on race and sex and less than twenty percent of the variation in mathematics was accounted for by socioeconomic class and kindergarten experience. In addition it was not known exactly what the children who attended kindergarten actually experienced. Studies should be conducted comparing two or more kindergarten mathematics programs to the amount of gain to determine if one type of approach is superior to another for children with certain characteristics related to socioeconomic levels. Further, mathematics performance should be studied in relation to children who have and have not received an organized preschool experience prior to kindergarten.

TABLE I

ANALYSIS OF VARIANCE SUMMARY OF MATHEMATICS ACHIEVEMENT OF MIDDLE AND LOWER SOCIOECONOMIC CLASS CHILDREN WHO ATTENDED OR DID NOT ATTEND KINDERGARTEN

Source	df	MS	F
Socioeconomic Class (A)	1	43.560	16.616**
Preschool Experience (B)	1	14.440	5.508*
AXB	1	6.760	2.579
Error	96	2.622	

** $p < .01$
* $p < .05$

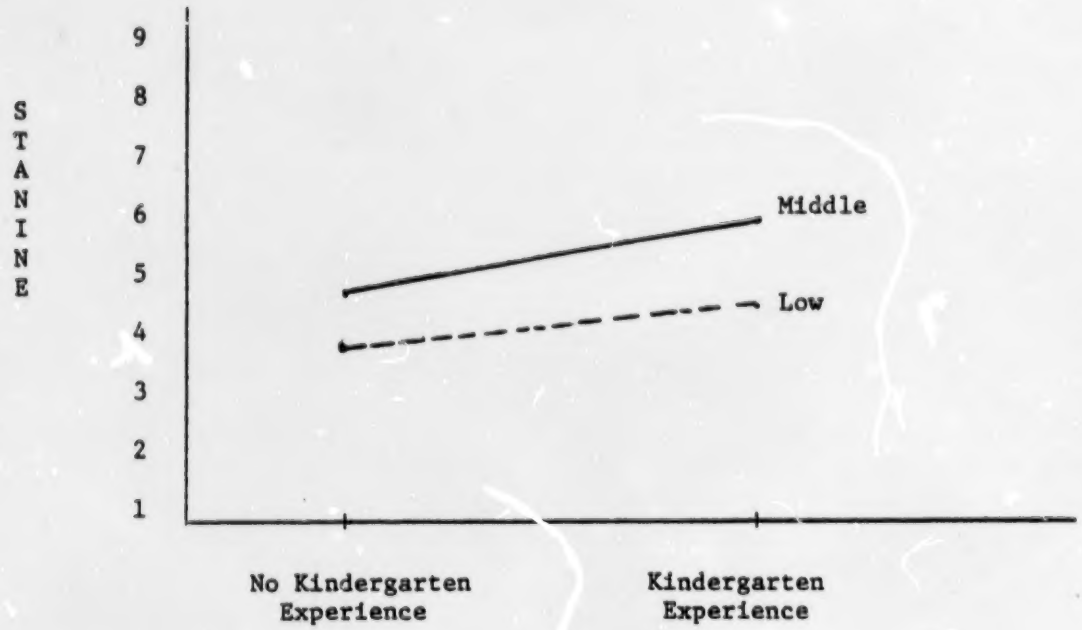
TABLE II

MEAN SCORES OF VARIOUS GROUPS ON STANINE SCORES

Socioeconomic Class	No Kindergarten	Kindergarten	Combined
Middle	4.68	5.96	5.32
Lower	3.88	4.12	4.00
Combined	4.28	5.04	4.66

Figure 1

MEAN STANINE SCORES OF MATHEMATICS READINESS



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